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WOOD, HERRON & EVANS, L.L.P.  
2700 Carew Tower  
441 Vine St.  
Cincinnati, OH 45202

EXAMINER

TANG, KENNETH

ART UNIT PAPER NUMBER

2195

DATE MAILED: 05/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/939,235

Applicant(s)

ARMSTRONG ET AL.

Examiner

Kenneth Tang

Art Unit

2195

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/7/04, 2/24/05, & 3/7/05
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This action is in response to the Amendment filed on 2/24/05. Applicant's arguments have been fully considered but are moot in view of the new grounds of rejections.
2. Claims 1-32 are presented for examination.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

- a. In claims 1, 13, 16, 28, and 31, "yield" is indefinite because it is not made explicitly clear in the claim language whether this indicates a result/execution or to concede (another definition of yield).
- b. In claims 1, 13, 16, 28, and 31, "second thread becoming ready to yield" (lines 6-7) is indefinite because it is not made explicitly clear in the claim language whether or not the second thread is yielding. Claim 1 implies that it is ready to yield, but it's unclear if the second thread also yields when the first thread is yielding.
- c. In claim 13, "subset" is indefinite because it is not made explicitly clear in the claim language what set the subset consists of.

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4. Claims 1-32 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are:

d. In claims 1, 13, 16, 28, and 31, there is no structural relationship established with “sharing resources” (line 1) to anything else in the claim.

e. In claim 13, 28, and 31, there is no structural relationship established with “common virtual space” to anything else in the claim.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**5. Claims 1-14, 16-29, and 31-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Spix et al. (hereinafter Spix) (US 6,195,676 B1).**

6. As to claim 1, Spix teaches a method for sharing resources on a multithreaded CPU capable of executing a plurality of threads (*col. 20, lines 38-49*), the method comprising:

deferring (deferring execution occurs when waiting) a yield of a first thread executing on the multithreaded CPU while waiting for at least a second thread executing on the multithreaded

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CPU to become ready to yield (waiting for synchronization to occur) (*col. 8, lines 61-67, through col. 9, lines 1-4 and col. 45, lines 37-53, e.g.*);

yielding the first thread in response to at least the second thread becoming ready to yield (parallel synchronization) (*col. 18, lines 8-34, e.g.*).

7. As to claim 2, Spix teaches monitoring the plurality of threads for an occurrence (*col. 10, lines 40-67, col. 11, lines 28-29*).

8. As to claim 3, Spix teaches wherein the occurrence is a spin lock (general spin suspended lock) or an idle loop (*col. 4, lines 14-21*).

9. As to claim 4, Spix teaches making a yield call in response to the occurrence (*col. 10, lines 40-67, col. 11, lines 28-29*).

10. As to claim 5, Spix teaches marking storage of the first thread in response to receiving the yield call to indicate that the first thread is ready to yield (*col. 45, lines 37-53*).

11. As to claim 6, Spix teaches spinning the first thread while waiting for at least the second thread to become ready to yield (*col. 4, lines 14-21*).

12. As to claim 7, Spix teaches abandoning (returning) the yield call in response to detecting an event (*col. 25, lines 18-47*).

13. As to claim 8, Spix teaches wherein the event is a time-out or an external interrupt (*col. 25, lines 18-47*).

14. As to claim 9, Spix teaches returning control of the first thread to an operating system in response to detecting the event (*col. 25, lines 18-47*).

15. As to claim 10, Spix teaches saving the state of the operating system in response to detecting that at least the second thread is ready to yield (*col. 28, lines 5-26*).

16. As to claim 11, Spix teaches idling at least the first and second threads within a common virtual space in response to at least the second thread being ready to yield (*col. 8, lines 61-67, col. 45, lines 37-53, col. 38, lines 9-18*).

17. As to claim 12, Spix teaches idling all threads executing on the multithreaded CPU within the common virtual space (*col. 8, lines 61-67, col. 45, lines 37-53, col. 38, lines 9-18*).

18. As to claim 13, it is rejected for the same reasons as stated in the rejection of claims 1 and 7. In addition, Spix's invention supports the parallel execution with at least a subset of the plurality of threads yield (limited subset of processing functions) (*col. 38, lines 41-48*).

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19. As to claim 14, Spix teaches yielding the thread after the subset of threads yield, if the subset of threads yield prior to the event (*col. 38, lines 41-48*).

20. As to claims 16-29, they are rejected for the same reasons as stated in the rejection of claims 1-14.

21. As to claim 31, it is rejected for the same reasons as stated in the rejection of claim 16.

22. As to claim 32, Spix teaches wherein the signal bearing medium (multiprocessor) includes at least one of a recordable medium (shared memory) and a transmission-type medium (*see Abstract*).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

23. **Claims 15 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spix et al. (hereinafter Spix) (US 6,195,676 B1) in view of Nakaya et al. (hereinafter Nakaya) (US 5,978,830).**

24. As to claim 15, Spix teaches interrupts but fails to explicitly teach wherein the event is selected from among a group consisting of a time-out, an I/O interrupt and a combination thereof. However, Nakaya teaches a parallel process synchronization that uses a combination of timeouts and interrupts for operating system control (*col. 24, lines 7-16*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the feature of a combination of timeouts and interrupts to the existing parallel process synchronization of Spix because this would provide control for the system (*col. 24, lines 7-16*).

25. As to claim 30, it is rejected for the same reasons as stated in the rejection of claim 15.

### ***Response to Arguments***

26. Applicant's arguments have been fully considered but are moot in view of the new grounds of rejections.

27. *In addition, Applicant argues the 35 USC 112, 2<sup>nd</sup> paragraph rejections on page 10 of 14 of the Remarks that the recited language is described in an enabling manner throughout the specification.*

In response, the Examiner states that a 35 USC 112, 1<sup>st</sup> paragraph rejection was not made regarding enablement or written description of the specification. The 35 USC 112, 2<sup>nd</sup> paragraph is directed to the claim language not written to be explicitly clear.




*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth Tang whose telephone number is (571) 272-3772. The examiner can normally be reached on 8:30AM - 6:00PM, Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kt  
5/12/05

  
MENG-AI T. AN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100